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**RUSSIAN AGENCY FOR PATENTS AND TRADEMARKS (ROSPATENT)
FEDERAL INSTITUTE OF INDUSTRIAL PROPERTY (FIIP)**

Your Re № 2412-121755.5042 of September 19, 2002

Our Re № 99120069/03 (021268)

In reply please refer to Application № and
indicate date of receipt of this communication

OFFICIAL ACTION

(21) Application № 99120069/03 (021268)

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(71) Applicant: CABOT CORPORATION

(51) IPC⁷ C04B 35/468, 35/628

QUESTIONS, ARGUMENTS, OBJECTIONS, PROPOSALS

As a result of substantive examination performed with taking into account the submitted materials received by the FIIP on September 19, 2002, the Mining and Construction Division finds as follows.

The Applicant asks to establish the Convention priority in accordance with the first Application № 08/801,450 filed with the US Patent Office.

According to Claim 1, disclosure is made of barium titanate-based particles having a coating comprising a metal oxide, metal hydrous oxide, metal hydroxide or organic salt of a metal other than barium or titanium, wherein at least 90 percent of said coated particles have a particle size less than 0.9 micrometer.

In the earlier Application of the same Applicant, published as WO 96/06811 on March 7, 1996, IPC C04B 35/468, 46 pp. [1], see Specification, p. 6, the second paragraph, p. 10, the third paragraph, and p. 12, the third paragraph, there is information to describe barium titanate-based particles having a coating comprising an

organic salt of a metal, particularly potassium or sodium, wherein a size of said particles is less than 0.5 micrometer which is less than 0.9 micrometer.

The above-listed essential features are common for the known technical solution and the claimed invention. In the Examiner's opinion, said reference is the closest similar solution to the claimed invention and will be considered by the Examiner as the prototype.

Further, the Examiner draws the Applicant's attention to the fact that known from the prior art is the Application published as WO 91/13042, IPC C04B 35/46, on September 5, 1991, 25 pp. [2], which discloses ceramic particles of barium titanate having a coating comprising a metal oxide, metal hydrous oxide and metal hydroxide, said metal being other than barium or titanium (see Claims 1 – 5 and the Specification, pp. 7 – 8, lines 31 – 19). Said reference also mentions a particle size from 0.1 micrometer and larger (The Specification, p. 7, lines 16 – 18).

The distinguishing feature of the claimed invention is the amount, that is, 90 percent of coated particles having a size less than 0.9 micrometer.

However, known from the prior art (see WO 93/16012 published on August 19, 1993, IPC C04B 35/46, 25 pp. [3]) is a method of impregnating a barium titanate powder with a slurry of various organic substances comprising, among others, organic acid salts of metals. The Examiner deems it necessary to note that application of a coating onto a surface of particles and impregnation of said particles are processes caused by interaction of a surface of particles with a medium representing an impregnating material or a material to be applied onto the surface of particles. In both cases of applying a coating onto the surface of particles and of impregnating said particles, a coating is formed on their surface as well. At the same time, used to carry out the prior art method are barium titanate-based particles (p. 5, paragraph 4) 90 percent of which have a particle size less than 1 micrometer, preferably less than 0.5 micrometer. Said feature corresponds to the distinguishing feature of the claimed invention and, in combination with the features of the similar solution [1] or [2], discloses the combination of essential features of the claimed invention according to Claim 1. Taking the foregoing into account, the Examiner can consider the proposed

invention as based on supplement of one known means by other known means, exactly, there is the publicity of barium titanate-based particles having a coating comprising an organic salt of a metal, a metal oxide, a metal hydrous oxide and a metal hydroxide, together with the publicity of a size ratio of said particles. Use of particles having said coating (see [1] and [2]) and use of said size (see [3]) allows to obtain thinner dielectric layers. Thus, the technical result of the prior art solutions is caused by use of particles having said coating and said distribution, which corresponds to the technical result of the claimed invention.

In the Examiner's opinion, the publicity of said similar solutions in the prior art casts a doubt for compliance of the claimed invention according to Claim 1 with the patentability condition of "inventive step" and, in accordance with para 19.5.3 of the Rules-1, the proposed invention as originally claimed is not patentable.

Taking into account the distinguishing features of the dependent Claims and information stated in the Specification, the Applicant may be offered to add the characterizing clause of Claim 1 by definitions of particles stated in dependent Claim 7, exactly, by the feature "a particle size distribution ratio D_{90}/D_{10} of less than 4."

In respect with independent Claim 17 whose subject-matter is a slurry, dispersion or slip comprising at least 50 weight percent of coated particles according to Claim 1, it should be noted that the similar solution [1] has Claim 1 which discloses obtaining a slurry, dispersion or slip comprising at least 30 volume percent of particles which have a coating including organic acid salts of metals, particularly sodium or potassium. As a result of the volume to weight percent inter-conversion (see Example 16, Table 1), the solid phase contents partially correspond to the claimed interval. The distinguishing feature of the claimed invention according to Claim 17 is the amount, that is, 90 percent of coated particles having a size less than 0.9 micrometer. As the Examiner already noted in respect with Claim 1, however, known from the prior art (see [3]) are barium titanate-based particles (p. 5, paragraph 4) 90 percent of which have a particle size less than 1 micrometer, preferably less than 0.5 micrometer, and which may also be used to prepare a slurry, dispersion or slip. Said feature corresponds to the distinguishing feature of the claimed invention and, in combination with the features of the similar

solution [1], discloses the combination of essential features of the claimed invention according to claimed Claim 17. In the Examiner's opinion, the publicity of said similar solutions in the prior art casts a doubt for compliance of the proposed invention according to Claim 17 with the patentability condition of "inventive step," since the Examiner can consider the proposed invention as based on supplement of one known means by other known means, exactly, there is the publicity of a slurry, dispersion or slip comprising barium titanate-based particles having a coating comprising an organic salt of potassium or sodium, a metal oxide, a metal hydrous oxide and a metal hydroxide, together with the publicity of a size ratio. Taking the foregoing into account, the claimed invention according to Claim 17 as originally claimed is not patentable.

The subject-matter of the invention according to Claim 19 is a wet cake comprising coated particles in accordance with Claim 1 and between 15 and 35 weight percent of an aqueous liquid. In the previous Application published as WO 96/06811 [1], the Applicant has described methods for applying wet layers of a slurry or slip comprising the coated particles, wherein said slurry or slip was applied to a surface and dried for 10 to 15 minutes at room temperature to form a wet layer. The Examiner would like to note that, from the submitted Examples and Table present in the previous Application, it is evident that the aqueous liquid contents in said slip or slurry, with a humidity of between 31 and 35, when said slip or slurry are applied onto a surface and then are dried, will be less than 35 weight percent, because the water contents are reduced during the drying. Further in accordance with publication of the first Application, the term "a wet cake" may be interpreted as "a wet crust" or "hardened crust." Thus, known from the similar solution [1] is a wet cake comprising coated particles, wherein the aqueous liquid contents in the prior art cake also correspond to the claimed interval. The distinguishing feature of the invention according to Claim 19 consists in use of the coated particles according to Claim 1. As already noted above, however, the combination of essential features defining the particles of Claim 1 is known from the similar solutions [1], [2] and [3]. Thus, the essential features of the similar solutions [1 - 2] in combination with the features of [3] disclose the essence of the claimed invention according to Claim 19. In the Examiner's opinion the claimed

invention may be considered as based on supplement of one known means by other known means, exactly, there is the publicity of a wet cake comprising titanate barium particles having said coating and the known particle size ratio, together with the publicity of the aqueous liquid quantity contents.

For the Applicant's information, the Examiner notes that, when preparing a slip, the filler contents are usually from 40 to 60 volume percent, and further, a portion of water is removed to prepare a plastic semi-finished product, while a residual density of a short-cake is between 15 and 30 % depending upon filtration conditions (see Bogoroditsky N.P. et al., Radiokeramika (Radio Ceramics) , Gosenergoizdat (State Energy Publishers), 1963, pp. 198 – 199 [4]).

The Examiner notes that an embodiment of "a wet cake" of barium titanate particles, with the solid phase contents of 80 to 85 weight percent, is described in US Patent № 4,832,939 published on May 23, 1989, IPC G01G 23/04, 18 pp. [5]. Thus, the publicity of said similar solutions in the prior art casts a doubt for compliance of the proposed invention according to Claim 19 with the patentability condition of "inventive step," and, in accordance with para 19.5.3 of the Rules-1, the proposed invention as originally claimed is not patentable.

In the Examiner's opinion, the essential features of dependent Claim 20, with the proviso of their inclusion in the characterizing clause of the independent Claim, define the subject-matter of Claim 19 more completely.

The subject-matter of the invention in accordance with Claim 21 represents barium titanate-based particles having a primary particle size less than 0.6 micrometer and a coating comprising a metal oxide, a metal hydrous oxide and a metal hydroxide of specified group, wherein at least 90 percent of said coated particles have a particle size less than 0.9 micrometer. As already noted, the similar solutions to be considered disclose barium titanate-based particles having a primary particle size from 0.05 to 0.5 micrometer (see [1], p. 7, lines 8 to 11) and a coating comprising a metal oxide, a metal hydrous oxide and a metal hydroxide of specified group (see [2], pp. 7 - 8, lines 31 – 19), wherein a metal is selected from the group claimed in Claim 21. The distinguishing features of the invention according to Claim 21 represent the amount,

that is, 90 percent of said coated particles having a particle size less than 0.9 micrometer. However, known from the similar solution [3] is use of barium titanate-based particles (p. 5, paragraph 4) 90 percent of which have a particle size less than 1 micrometer, preferably less than 0.5 micrometer, that is, a particle size is less than 0.9 micrometer. Thus, the distinguishing features of the similar solutions [1, 2] together with the features of reference [3] disclose the essence of the claimed invention according to Claim 21. Based on the foregoing, the Examiner can consider the proposed invention as based on supplement of one known means by other known means, exactly, there is the publicity of barium titanate-based particles having said coating comprising a metal oxide, a metal hydrous oxide and a metal hydroxide, together with the publicity of a size ratio of aqueous liquid content quantity; in other words, use of barium titanate-based particles having said coating, as disclosed in references [1] and [2], and use of said size, as disclosed in references [1] and [3], allows to obtain thinner dielectric layers. In the Examiner's opinion, the publicity of said prior art solutions casts a doubt for compliance of the claimed invention according to Claim 21 with the patentability condition of "inventive step" and, in accordance with para 19.5.3 of the Rules-1, the proposed invention as originally claimed is not patentable.

Taking into account the distinguishing features of the dependent Claims and information stated in the Specification, the Applicant may be proposed to add the characterizing clause of Claim 21 by definitions of particles stated in dependent Claim 26, exactly, by the feature "a particle size distribution ratio D_{90}/D_{10} of less than 4."

In respect with independent Claim 36 whose subject-matter is a slurry, dispersion or slip comprising at least 50 weight percent of coated particles according to Claim 21, it should be noted that the similar solution [1] has Claim 1 which discloses obtaining a slurry, dispersion or slip comprising at least 30 volume percent of coated particles. As a result of the volume to weight percent inter-conversion (see Example 16, Table 1), the solid phase contents partially correspond to the claimed interval. The above-listed features are common for the claimed invention and prototype. The distinguishing feature of the claimed invention according to Claim 36 is the amount, that is, 90 percent of coated particles having a size less than 0.9 micrometer. As the Examiner already

noted, however, known from the prior art (see [3]) are barium titanate-based particles (p. 5, paragraph 4) 90 percent of which have a particle size less than 1 micrometer, preferably less than 0.5 micrometer, and which may also be used to prepare a slurry, dispersion or slip. Said feature corresponds to the distinguishing feature of the claimed invention and, in combination with the features of the similar solution [1], discloses the combination of essential features of the claimed invention according to claimed Claim 36. Thus, the Examiner can consider the proposed invention as based on supplement of one known means by other known means, exactly, there is the publicity of a slurry, dispersion or slip comprising barium titanate-based particles having a coating, together with the publicity of a size ratio of said particles. In the Examiner's opinion, the publicity of said similar solutions in the prior art casts a doubt for compliance of the proposed invention according to Claim 36 with the patentability condition of "inventive step" and, in accordance with para 19.5.3 of the Rules-1, the proposed invention as originally claimed is not patentable.

The subject-matter of the invention according to Claim 38 is a wet cake comprising coated particles in accordance with Claim 21 and between 15 and 35 weight percent of an aqueous liquid. The Examiner noted that "a wet cake" is an intermediate product prepared by reducing the water contents in a slip or slurry. As the Examiner already noted in respect with Claim 19, in the previous Application published as WO 96/06811 [1], the Applicant has described methods for applying wet layers of a slurry or slip comprising the coated particles, wherein said slurry or slip was applied to a surface and dried for 10 to 15 minutes at room temperature to form a wet layer. The Examiner would like to note that, from the submitted Examples and Table present in the previous Application, it is evident that the aqueous liquid contents in said slip or slurry, with a humidity of between 31 and 35, when said slip or slurry are applied onto a surface and then are dried, will be less than 35 weight percent, because the water contents are reduced during the drying. Further in accordance with publication of the first Application, the term "a wet cake" may be interpreted as "a wet crust" or "hardened crust." Thus, known from the similar solution [1] is a wet cake comprising coated particles, wherein the aqueous liquid contents in the prior art cake also corresponds to

the claimed interval. The distinguishing features of the invention according to Claim 38 consists in use of barium titanate-based particles having a coating comprising a metal oxide, a metal hydrous oxide and a metal hydroxide, wherein a metal is selected from the group claimed in Claim 21, and in that 90 percent of the coated particles have a particle size less than 0.9 micrometer. As already noted in respect with Claim 21, however, the similar solutions disclose barium titanate-based particles having a primary particle size from 0.05 to 0.5 micrometer (see [1], p. 7, lines 8 – 11) and a coating comprising a metal oxide, a metal hydrous oxide and a metal hydroxide (see [2], pp. 7 - 8, lines 31 – 19), wherein a metal is selected from the group claimed in Claim 21. At the same time, known from the similar solution [3] is use of barium titanate-based particles (p. 5, paragraph 4) 90 percent of which have a particle size less than 1 micrometer, preferably less than 0.5 micrometer, that is, a particle size is less than 0.9 micrometer; in other words, the listed features of the similar solutions correspond to the distinguishing features of the claimed invention according to Claim 36. In the Examiner's opinion, with the publicity of said similar solutions in the prior art, the claimed invention may be considered as based on supplement of one known means by other known means, exactly, the combination of essential defining the particles of Claim 21 is known from the similar solutions [1], [2] and [3], while there is the publicity of the aqueous liquid quantity contents in the similar solutions [1], [4]. Thus, the combination of essential features of the similar solutions [1 – 4] discloses the essence of the claimed invention according to Claim 38, exactly, there is the publicity of a wet cake comprising titanate barium particles, together with the publicity of sizes of said particles at the publicity the aqueous liquid quantity contents.

The Examiner also draws the Applicant's attention to that the information is known from [4], which specifies that, when preparing a slip, the filler contents are usually between 40 and 60 weight percent, and a portion of water is further removed to prepare a plastic semi-finished product, while a residual density of a short-cake is between 15 and 30 % depending upon filtration conditions, with 80 to 85 weight percent of a solid phase therein, is disclosed in US Patent № 4,832,939.

Based on the arguments above, the Examiner is of the opinion that the proposed invention does not comply with the patentability condition of "inventive step," and, in accordance with para 19.5.3 of the Rules-1, the proposed invention as originally claimed is not patentable.

The subject-matter of the invention according to Claim 40 represents non-milled barium titanate-based particles, wherein 90 percent of said non-milled particles have a size of less than 0.9 micrometer and a coating comprising a metal oxide, metal hydrous oxide, metal hydroxide or organic salt of a metal other than barium or titanium. Said non-milled particles are dispersed by high shear mixing. The Examiner draws the Applicant's attention to the fact that known from the similar solution [1] are non-milled barium titanate-based particles comprising a coating having an organic acid salt of a metal, in particular sodium or potassium, and in accordance with Example 16, the prior art particles are dispersed by high shear mixing, wherein a size of said coated particles is less than 0.5 micrometer which is less than 0.9 micrometer. Additionally, the Examiner draws the Applicant's attention to the fact that known from the prior art is the Application published as WO 91/13042, IPC C04B 35/46, on September 5, 1991, 25 pp. [2], are ceramic particles of barium titanate having a coating comprising a metal oxide, metal hydrous oxide and metal hydroxide (see Claims 1 – 5 and the Specification, pp. 7 – 8, lines 31 – 19). Said reference also mentions a particle size from 0.1 micrometer (see the Specification, p. 7, lines 16 – 18).

The distinguishing feature of the claimed invention is the amount, that is, 90 percent of coated particles having a size less than 0.9 micrometer. However, known from the similar solution [3] are barium titanate-based particles (p. 5, paragraph 4) 90 percent of which have a particle size less than 1 micrometer, preferably less than 0.5 micrometer. Said feature corresponds to the distinguishing feature of the claimed invention and, in combination with the features of the similar solutions [1] and [2], discloses the combination of essential features of the claimed invention according to Claim 40. In the Examiner's opinion, the publicity of said similar solutions in the prior art casts a doubt for compliance of the claimed invention according to Claim 40 with the patentability condition of "inventive step," because the proposed invention may be

considered as based on supplement of one known means by other known means, exactly, there is the publicity of non-milled barium titanate-based particles having a coating comprising an organic salt of sodium or potassium, a metal oxide, a metal hydrous oxide and a metal hydroxide, together with the publicity of a size ratio of said particles. Since the use of non-milled particles prepared from a solution and having said coating is known from references [1] and [2], and use of said size is known from [3], this allows to obtain thinner dielectric layers. Thus, the technical result of the prior art solutions is stipulated by use of particles having said coating and said distribution, which corresponds to the technical result of the claimed invention. Taking the foregoing into account, the proposed invention as originally claimed is not patentable. Taking into account the distinguishing features of the dependent Claims and information stated in the Specification, the Applicant may be proposed to add the characterizing clause of independent Claim 40 by definitions of coated particles (Claim 46), exactly, by the feature "a particle size distribution ratio D_{90}/D_{10} of less than 4."

The subject-matter of the invention according to Claim 56 is a slurry, dispersion or slip comprising at least 50 weight percent of coated non-milled particles according to Claim 40. However, it should be noted that the similar solution [1] has Claim 1 which discloses Examples which provide obtaining a slurry, dispersion or slip comprising 30 volume percent of coated non-milled particles prepared by high shear mixing. As a result of the volume to weight percent inter-conversion (see Example 16, Table 1), the solid phase contents partially correspond to the claimed interval. The above-listed features are common essential features for the claimed invention and prototype. The distinguishing feature of the claimed invention according to Claim 56 is the amount, that is, 90 percent of coated particles contained in said slip or slurry and having a size less than 0.9 micrometer. As the Examiner already noted, known from the prior art (see [3]) are a slurry or a slip including barium titanate-based particles (p. 5, paragraph 4) 90 percent of which have a particle size less than 1 micrometer, preferably less than 0.5 micrometer, and which may also be used to prepare a slurry, dispersion or slip. Said feature corresponds to the distinguishing feature of the claimed invention and, in combination with the features of the similar solution [1], discloses the combination of

essential features of the claimed invention according to claimed Claim 56. Thus, the proposed invention may be considered as based on supplement of one known means by other known means, exactly, there is the publicity of a slurry, dispersion or slip comprising coated non-milled barium titanate-based particles having said coating, together with the publicity of a size ratio of said particles. In the Examiner's opinion, the publicity of said similar solutions in the prior art casts a doubt for compliance of the proposed invention according to Claim 56 with the patentability condition of "inventive step," and, in accordance with para 19.5.3 of the Rules-1, the proposed invention as originally claimed is not patentable.

The subject-matter of the invention according to Claim 58 is a wet cake comprising coated non-milled particles in accordance with Claim 40 and between 15 and 35 weight percent of an aqueous liquid. The Examiner noted that "a wet cake" is an intermediate product prepared by reducing the water contents in a slip or slurry. As noted earlier, in the previous Application published as WO 96/06811 [1], the Applicant has described methods for applying wet layers of a slurry or slip comprising the coated non-milled particles, wherein said slurry or slip was applied to a surface and dried for 10 to 15 minutes at room temperature to form a wet layer. The Examiner would like to note that, from the submitted Examples and Table present in the previous Application, it is evident that the aqueous liquid contents in said slip or slurry, with a humidity of between 31 and 35, when said slip or slurry are applied onto a surface and then are dried, will be less than 35 weight percent, because the water contents are reduced during the drying. Further in accordance with publication of the first Application, the term "a wet cake" may be interpreted as "a wet crust" or "hardened crust." Thus, known from the similar solution [1] is a wet cake comprising coated non-milled particles, wherein the aqueous liquid contents in the prior art cake also correspond to the claimed interval. The distinguishing features of the invention according to Claim 58 consist in use of particles having a coating comprising a metal oxide, a metal hydrous oxide and a metal hydroxide, wherein a metal is selected from the group claimed in Claim 21, and in that 90 percent of the particles have a particle size less than 1 micrometer, preferably less than 0.5 micrometer, that is, the particle size is less than 0.9 micrometer. As noted

earlier, however, disclosed in the similar solutions are barium titanate-based particles having a size of 0.05 to 0.5 micrometer (see [1], p. 7, lines 8 – 11) and having a coating comprising a metal oxide, a metal hydrous oxide and a metal hydroxide (see [2], pp. 7 - 8, lines 31 – 19), wherein a metal is selected from the group claimed in Claim 21. At the same time, known from the similar solution [3] is use of barium titanate-based particles (p. 5, paragraph 4) 90 percent of which have a particle size less than 1 micrometer, preferably less than 0.5 micrometer, that is, a particle size is less than 0.9 micrometer; in other words, the listed features of the similar prior art solutions correspond to the distinguishing features of the claimed invention according to Claim 58. In the Examiner's opinion, with the publicity of said prior art similar solutions, the claimed invention may be considered as based on supplement of one known means by other known means, exactly, the combination of essential defining a wet cake comprising non-milled particles is known from the similar solutions [1], [2] and [3], while there is the publicity of the aqueous liquid quantity contents disclosed in the similar solution [1].

The Examiner also draws the Applicant's attention to that known from [4] is information specifying that, when preparing a slip, the filler contents are usually between 40 and 60 weight percent, and a portion of water is further removed to prepare a plastic semi-finished product, while a residual density of a short-cake is between 15 and 30 % depending upon filtration conditions, with 80 to 85 weight percent of a solid phase therein, is disclosed in US Patent № 4,832,939.

In the Examiner's opinion, the publicity of said similar solutions in the prior art casts a doubt for compliance of the claimed invention according to Claim 58 with the patentability condition of "inventive step" and, in accordance with para 19.5.3 of the Rules-1, the proposed invention as originally claimed is not patentable.

The Examiner draws the Applicant's attention to the fact that dependent Claim 59 refers to independent Claim 38, while para 3.3.2.2 of the Rules 1 instructs that a dependent Claim is to be grouped with an independent Claim said dependent Claim is subjected to. On this basis, the Applicant is invited to either amend the subordination of Claim 59 or group it in accordance with subordination to independent Claim 38.

The Applicant is invited to analyze the Examiner's arguments, express own opinion, and submit the amended set of Claims to be considered further.

We send You hereby copies of said reference Bogoroditsky N.P. et al., Radiokeramika, Gosenergoizdat, 1963, pp. 198 – 199

Enclosure: Said copies, 1 p., 1 c., to the Applicant's address.

Chief of
of Mining and Construction Division

signature

E.V. Judina